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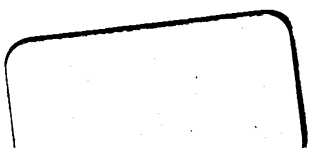

THE

NATURE AND TREATMENT

OF

SPORADIC AND EPIDEMIC CHOLERA.

BY

ALEXANDER HARKIN, M.D., F.R.C.S.;

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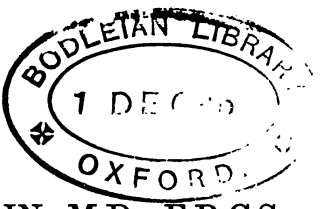

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THE NATURE AND TREATMENT

OF

SPORADIC AND EPIDEMIC CHOLERA.[a]

THE subject for discussion this evening is one of paramount importance. Cholera, that dread disorder, while ravaging some of the fairest cities of Continental Europe during the past year, has been hovering ominously round our coasts, and we know not the day nor the hour that it may gain a footing in our midst.

Our professional brethren in London have fixed an early day for its consideration, the Local Government Board has lately appointed an additional staff of medical inspectors for the ports, and the medical faculty in Paris, I have reason to know, are already preparing for its reception, on the very probable presumption of its recrudescence in the early spring.

It is, therefore, in my mind, both wise and expedient that we should also take counsel together, and with the experience of those who, like myself, have witnessed every outbreak of the disease in this town, and encountered it in all its forms, and the information supplied by modern science and experiment, we may be enabled to devise competent measures of prophylaxis, and to formulate a plan of treatment on a satisfactory basis. But, to understand the subject thoroughly, we should, in the first place, take a glance at its history. Spasmodic or Asiatic cholera has been known to exist in an endemic form for many centuries in Hindostan, and to have become occasionally epidemic among the natives since its occupation by England. In the year 1817, however, it assumed a novel and more aggressive character, and quitting its original *habitat* at Jessore in the delta of the Ganges, passing the boundaries of that river, and putting on a migratory and epidemic form, travelling eastward in Asia, and westward in Europe by river and sea coast, and along the principal paths of human intercourse, till, after a progress of twenty years' duration, it at last reached the British Isles. It appeared first at Sunderland, a town in close commercial relations with Hamburg, then infected, upon 4th November, 1831; at Edinburgh, on 27th January, 1832; in London, 10th January, same year; in Dublin, 22nd March; and in Belfast, 14th April, 1832.[b]

[a] Read before the Ulster Medical Society, March 26, 1885.

[b] Graves' Clinical Lectures. Vol. I. Art., Cholera.

I well remember the feelings of terror and dismay exhibited by my fellow-townsmen on that memorable occasion. The accounts from Paris were very alarming, 385 deaths having occurred on 8th April, a few days previously. The mortality in England was not excessive, but in Dublin and Sligo it was very great, owing principally to the inferior diet, and the overcrowding of the poor in both those cities. A large number perished in Belfast, and some of the deaths were so sudden that the ignorant people imagined that their friends had been poisoned by the doctors—one esteemed physician having had to fly for his life, and clear a boundary wall to escape from the fury of the women. The minds of the people were unnecessarily depressed by the unwise arrangements of the Board of Health, by whose directions men in white smock-frocks paraded the streets, scattering lime broadcast as they passed along, ringing bells to warn the people off the streets when an ambulance was passing, conveying the sick to hospital, or a hearse carrying a corpse to the grave. At that time one of our national poets, John Banim, chose for his theme the all-engrossing topic, and in the "Dirge of the Cholera" made the dreaded potentate address the trembling nations in very stirring language, one stanza of which I still remember:—

> "Earth, tell me my commission, as from land to land I go,
> And the time, and place, and season, for me my might to show;
> Mankind declared the limits of my stay and scope with you,
> Come, prophesy the ending of the work I have to do!"

And although distress and suffering were visible on every side, yet out of great evil came a greater good, and a lasting benefit resulted from the visitation of the great sanitary reformer, for those pestilent slums and overcrowded hovels, those narrow lanes and unventilated alleys in which he revelled and found his daily victims, have been long since swept away, and been replaced by spacious thoroughfares and streets, well lighted and sewered. An abundant supply of pure water has been brought to the door of every inhabitant, baths have been erected, an end practically put to intra-mural interment, public cemeteries, parks, and abattoirs provided, overcrowding of lodging-houses prevented by official inspection, and the teachings of sanitary science recognised by all. Much, however, remains to be accomplished ere we can plume ourselves on our superior, or even on a satisfactory sanitary condition, or be in a position to defy the inroads of epidemic disease. We cannot boast of a comprehensive system of drainage; we have still to complain of a Blackstaff nuisance abated, but not suppressed; of an open sewer called the Millfield dam, traversing a densely-populated district; our street sewers are constituted on the principle of allowing all their valuable contents to run waste into the Lagan, causing the defilement of that naturally limpid stream, and as a result, in the hot season the deposits at Ormeau and in the bay at Holy-
some sources of discomfort and danger to the residents in the

neighbourhood. The system of air-holes on the street level, communicating with the sewers, is equally objectionable; it has been condemned by the highest sanitary authority. These apertures may give vent to noxious vapours affecting the passers-by, perhaps laden with the mephitic poison of enteric or other infectious disorders, or, in the possible event of its arrival, the virus of cholera itself evolved from the intestinal discharges of patients. This evil has lately been recognised and provided for in the city of London, for the Commissioners of Sewers are about to arrange, according to the *Lancet*, with all builders of new houses, to construct pipes for ventilating the house sewers, and to carry them above the roofs of the houses. When this is done effectually the ground level openings can be closed, and then the plague of sewer-gas will be a thing of the past.[a] Let us hope that our present worthy Mayor, who, like his prototype, the Roman governor of old, presides at once over our roads and bridges, may apply his eminent engineering and scientific acquirements to the suppression of those perennial sources of evil, the pollution of our tidal river, and other removable sources of sickness.

While on this topic, I think that it is a matter for grave consideration whether there should not be established a Citizen Sanitary Association in Belfast, to aid, as in Dublin, the efforts of the officers of the Corporation and of the Local Government Board. By the exertions of the Dublin Association numberless advantages have accrued to the citizens in the lessening of the sources of disease, ending in the result desired—the diminution of the death-rate. The contrast between the result of forethought and improvidence is clearly manifested by the details of the recent visitation of cholera in two Italian cities. In Naples, owing to the filth, the overcrowding, the narrow thoroughfares, and the lazy and luxurious habits of the Lazzaroni and other inhabitants, and the remissness of the municipal authorities, the mortality was appalling—equalling, during the continuance of the epidemic, the horrors of the pestilence in the Middle Ages; while in Rome, although several times attacked, through the prevision of the Government and the municipality, every case was isolated on its occurrence, and by means of medical inspection and perfect sanitation the pestilence was effectually stamped out before it had time to spread among the inhabitants.

In the actual presence of the epidemic one should cultivate a cheerful spirit, avoid unreasoning panics, and be observant of the rules of temperance in eating and drinking. It is not advisable to make any marked change in the ordinary dietary, but fish, unripe fruit, heavy soups, and twice-cooked food should be avoided. Excessive fatigue, long watching, late hours, and exposure to night air, are powerful predisposing causes. The clothing should be comfortable, with flannel next the skin; an abdominal flannel belt should be worn, such as was issued by the Horse.

[a] Lancet. October, 1884.

Guards to every individual soldier during the prevalence of cholera in the neighbourhood. No purgative should be taken without medical advice. I lost a patient, in the epidemic of 1849, from his having unadvisedly taken a dose of Epsom salts. Cleanliness in the person, in clothing, and in the household, should be religiously observed. Frequent flushing of the closets and sewers should be carried out, followed by disinfectants, such as chloride of lime and zinc, sulphate of iron, or carbolic acid, and sulphur ignited occasionally in the halls and chambers. Every kind of filth that would be likely to contaminate the air, the food or the water of the community, should be got rid of. The evacuations of cholera patients should be received in vessels containing chloride of lime or carbolic acid. The clothing of the sick person should be exposed to the fumes of sulphur, to carbolic acid diluted, or in some cases, such as bed linen, destroyed by fire. Free ventilation and open air exercise for the healthy are advisable. Neither food nor any beverage should be partaken of in the sick room, and the hands engaged in ministering to the cholera patient should be carefully washed and disinfected before sitting down to a meal, by a solution of either bichloride of mercury, or other active remedy.

As a prophylactic, there is none equal in efficacy to dilute sulphuric acid, ten or fifteen drops of which should be taken three or four times daily in a goblet of water; by its careful administration to the inmates of the County Antrim District Asylum, Doctor MacCormac had the satisfaction of preserving them all from cholera during more than one epidemic, while the pestilence had obtained a footing in other institutions in Belfast. And in an epidemic of choleraic diarrhœa, some time since in London, Dr. Lewis, then Surgeon to the Post Office, rendered essential service to the employés by enjoining on them the use of the dilute sulphuric acid and water, which he called by the name of mineral lemonade.

While merely an interested observer of the epidemic of 1832, on its re-appearance, in 1834, I had the advantage of studying it in all its phases, when acting as pupil and assistant to my venerable preceptor and friend, Dr. Henry MacCormac, the Nestor of the medical profession in Belfast, and at that time in charge of the Cholera Hospital. His treatment was remarkably successful, for, even in the first outbreak, and in his statistical return to the Board of Health in 1832, he gave the details of 726 cases, with only 173 deaths, including patients also ill with chronic diseases, aged persons, infants, child-bearing women, and many moribund on admission. His plan of treatment was, in an adult not previously debilitated, to take from ten to thirty ounces of blood from the arm, to administer a scruple of calomel, with two grains of opium, washed down with brandy, or whiskey and water, and forty drops of laudanum; the medicine to be repeated in two or four hours till relieved. This was

accompanied with stimulating liniments, frictions, hot air baths, rest in bed, and free draughts of cold water. After a few repetitions of the dose, the patient often awoke very weak, but out of danger. The consecutive fever, when it developed, was treated on ordinary principles. We had a recurrence of cholera in 1846–49, 1854, and 1866; some of these outbreaks were very severe, and while the indigent and the dissipated suffered most, we had invariably to lament the loss of citizens foremost in every philanthropic work. The epidemic of 1849 was especially fatal; its footsteps might be tracked, and its favourite haunts discerned, along the borders of the Blackstaff in Sandy-row, and in Lagan-street, where the muddy stream empties itself into the Lagan, by the damside and the Pound burn. The inhabitants of the Lagan village were nearly decimated. At that time, though close to the River Lagan, there was not even an attempt at sewerage; all the nuisances of the houses passed into puddles in front of the doors, making their way as best they could to the riverside; the more solid matter were collected and piled up on a heap at the end-house of the village till sufficiently large to be carted away. The sights and scenes in that locality are among the most painful of my recollections.

I have lying before me while I write a duplicate copy of a return to the local sanitary authority of thirty-two private patients attended in the epidemic of 1849—thirty-two patients and ten deaths. The treatment I followed was founded on my hospital experience. I find, however, that among the remedies used I trusted a good deal to the favourite prescription of Dr. Graves—the pil. plumbi. c. opio.

That spasmodic cholera is a zymotic disease of a highly infectious nature, the great bulk of the profession has always avowed, although at all previous times, as at present, there existed a small but very intelligent body that refused to admit the fact. The lesson taught by every visitation in Belfast demonstrated plainly that cholera is an imported disease, spreading rapidly wherever it obtains admission, among the predisposed. The first case that appeared in Belfast in 1832, as reported by MacCormac, came from Glasgow; and the primary case in the last invasion was also an imported one, and arose in this way:—A woman having been deserted by her husband, took refuge in the Union Workhouse; a warrant was issued by the Belfast magistrates for his arrest; he was discovered in Edinburgh, and resided in a house in a wynd infected with cholera. On his way over in custody he became ill, and on his arrival he was removed to the Union Hospital, where I saw him. His wife joined him there. He was then in the algide stage, and died soon after. After the man's death one of the nurses in attendance took the disease, his wife removed to Millfield, and although not affected herself, the people with whom she lodged took the disease from her, which then spread like wildfire through Millfield and the damside, and

eventually through the town. What better proof of the infectious nature of the disease could be given?

The intimate nature of the poison of cholera has always given rise to much speculation and discussion; it was formerly regarded by the contagionists as intangible and akin to the poison of scarlatina or typhoid fever, and propagated through the medium of the atmosphere by personal contact, or by fomites. Pettenkofer looks upon it as of malarial origin; he considers that the propagation of cholera is due to the rice water stools of patients, when in a state of fermentation, commingling with the soil, and that the special poison of cholera is a miasm generated out of this earth fermentation; he believes, also, that the dejecta of persons suffering from cholerine or diarrhœa are equally capable with cholera dejections of producing the pestilence.

The causal relations of micro-organisms to cholera have been much discussed, and later scientists, such as Koch and his followers, insist that it is owing to the influence of a microbe or bacillus, comma-shaped, always present in the intestines or excretions of cholera patients; while Klein and Cunningham as stoutly deny the truth of its universality, and affirm that cholera occurs independently of its presence, that the bacillus referred to is often found in the saliva of healthy individuals, and in the intestines of those dying of dysentery and other non-infectious disorders. In the Report of the Special Commission sent out to make a scientific inquiry into cholera in India, these gentlemen, in their preliminary statement, set forth explicitly that the comma-shaped bacillus of Koch is neither universally present in cholera excreta, nor to be found in any quantity in the intestinal walls; that it occurs in other intestinal affections, and that in its mode of development in artificial cultures it does not behave differently from the ordinary mode of growth of putrefactive bacteria. The Commissioners deny to the special form of bacillus any distinctive or pathogenic property, and these observations stand in direct contradiction to the very positive affirmations of the Berlin authority.—*Lancet*, Cholera Report.

The truth of the comma-bacillus theory has also been very widely questioned by Dr. Emmerich, of Munich, who has discovered the existence of a bacterial organism in all the tissues of cholera-affected patients; his statements have been confirmed by the observations of Dr. Buchner, who maintains that the organisms should be distributed in the tissues generally; whereas the comma-bacilli are but seldom found in the intestinal walls, and not at all in any of the internal organs. He further maintains that no corresponding relation exists between the number of the bacilli and the severity of the attack, and that very severe cases of cholera have been observed in which they seem to be altogether absent.

In so far we may fairly consider that the arguments on either side are inconclusive; and, looking at the discussion from a practical or therapeutic

point of view, we may feel inclined to agree with Virchow; when referring to the question of the cholera bacillus in the German Reichstag, he warned the members, amid the murmurs of many, not to imagine that the question was finally settled with its discovery, and hinted that we were no nearer the eradication of consumption, with all our knowledge of tubercle bacillus.[a]

But whatever the remote cause, be it microbe or bacillus, or some yet undiscovered factor, under its influence the nervous system becomes rapidly involved and its agency manifested in every prominent symptom; vomiting and purging are apparently due to an abnormal or excited condition of the nervous supply to the stomach and bowels; the choleraic voice, the vertigo, the spasms and cramps, the tremors betray their neurotic origin; the symptoms of collapse characteristic of the algide state, in accordance with the experiments and teaching of Claude Bernard, are dependent upon great irritation and hypertrophy of the sympathetic nervous system; while to the vaso-motor nerves may be attributed that depression of the functions of respiration and circulation, the most dangerous affections in the disease. We may discover additional proofs of nervous agency in the rapid deaths by cholera-sicca which occur in every epidemic, when men are stricken down as if by lightning, or prussic acid, or the concentrated virus of the upas tree; those rapid recoveries, too, that occur so often in cases apparently hopeless, forbid the idea that any serious organic affection could be the cause of the gravest symptoms.

In Dr. MacCormac's philosophic "Exposition of the Nature of Spasmodic Cholera," published in 1832, he gives it as his opinion "that the poisonous agency which produces cholera acts by destroying or diminishing the action of one of the three grand divisions of the nervous system by whose powers the human frame is maintained in life and vigour—the respiratory, the cerebral, and the sympathetic; and it is by the lesion or injury of the latter that we suppose cholera to be produced." Most of our modern authorities assign a similar reason for its causation, and Dr. Johnston and others give it as their opinion that the specific poison acts previously on the blood or the intestinal canal, then affects certain portions of the nervous system, especially the sympathetic and the nerve centres, thus influencing the circulating and respiratory organs.[b]

It then, I think, may be taken for granted that it is to a lesion of the sympathetic system that spasmodic cholera is due; and this being admitted, it would naturally follow that in looking for a remedy we should seek out an agent that will control and influence the system at fault. The indications for treatment, according to MacCormac, "consist in increasing the power of the stricken system of nerves, in remedying the results of its inefficiency, and in lessening and rendering light and

[a] Vide Archiv Med., p. 173. October, 1884.

[b] Vide Roberts' Practice of Medicine. P. 196. Article, Cholera.

easy the burden of its functions. There is, perhaps, no stimulant," he continues, "real or supposed, in the catalogue of medicine which has not been tried. *We are not acquainted with any direct and certain means of acting on the sympathetic nerves independently of the rest of the nervous system, and as this disadvantage cannot be avoided, it must be submitted to.*"

These pregnant and suggestive words were written more than half a century ago, and when perusing them for the first time very recently I was struck with admiration of the wonderful prevision of the writer, and with the philosophic grasp of mind which he brought to bear on the subject. I trust that I shall be enabled further on to demonstrate satisfactorily that modern physiological discovery, allied with clinical observation and experiment, have successfully supplied the desideratum, the want of which MacCormac so feelingly lamented.

While the doctor is perfectly sound in localising the lesion in the sympathetic, he erred, with many others, in mistaking irritation and hypertrophy for debility, and this was not unnatural in his case, as it was not till many a decade afterwards that Claude Bernard gave publicity to those scientific investigations which threw so much light on the pathology of cholera, and the *rôle* played by the sympathetic system in that disease. But, if it be true that the science of public health is devoted to the detection and prevention of disease, it is equally true to say that the science of medicine teaches us how to treat it after it has occurred, and to use every effort to effect a cure. Should it, then, unfortunately happen that all our preventive measures prove unavailing, that the enemy may carry our outer line of defence and penetrate into our citadel, it behoves us to settle beforehand how we shall act—with what arms, with what therapeutic remedies, we shall encounter the foe. Up to the present date the treatment of cholera has been empirical, or otherwise based on some hypothesis or theory unsupported by clinical facts; of the two, the empirical, founded on ordinary observations of accidental relief, is the safer; for, in the words of Haynes Walshe:—"False theory is worse than no theory at all, in a sphere of knowledge where speculation entails action, where the practice of an art flows from the doctrines of a science."[a] It is thus that the castor-oil treatment of Johnston, founded on the eliminative idea, has proved a failure, because the theory itself has no pathological facts to sustain it. The same may be said of the depletive, the opiate, the calomel, the astringent, saline, derivative ozone and oxygen, the electrical and stimulant plans, spinal ice-bag of Chapman, venous injections, &c.

With regard to castor-oil, writes Dr. Macnamara:—"I was acting as House Physician to King's College Hospital, in 1854, when Dr. G. Johnston was treating his cholera patients on eliminative principles. I caught some of his enthusiasm on the subject, and came out to India the

[a] Address on Medicine. Brit. Med. Jour., August 9, 1862.

same year full of confidence and hope in castor-oil. These ideas were destined soon to pass through a severe ordeal, for in the following year I was left at Bhengulpore in charge of a field hospital. I was the only medical man in the place when cholera burst out among the Europeans and natives under my care. I went boldly to work with castor-oil, but it absolutely and completely failed. The mortality from the disease was fearful. I have since, on several occasions, tried castor-oil in cholera, but I have now finally abandoned it, having never seen any benefit arise from its use."—Aitken's "Science and Practice of Medicine," Vol. I., p. 717.

Doubtless I have witnessed recoveries under the most diverse plans of treatment, but, under the most successful, with a lamentable death-rate. Can the present generation really assume any progress in treatment, when the official reports from Paris last year give a percentage of deaths such as 50, and this not alone on the gross, but, what is more remarkable, a death-rate of one in two as the unvarying result after every distinctive mode of treatment? Need we wonder, then, that in India it is found that recoveries are as frequent under Nihilistic treatment as under the most energetic and scientific mode? In spasmodic cholera there are three well-defined stages—the preliminary, or diarrhœal; the stage of vomiting, purging, and cramps; and the third, or the algide, a state of collapse, with absent pulse, cold tongue and extremities, blue skin, and suppression of urine. The first stage may continue for hours or days, and yet, if unattended to, the different forms may follow so rapidly on each other that all interference may come too late. It is then of vital importance to call for medical aid without delay. In the words of Dr. MacCormac:—"There is no other disease for the cure of which so much depends upon the mental resources and presence of mind of the practitioner, or in which there is a greater temptation to heap remedy on remedy without calculating the strength of the remaining powers, and how much medication they are fitted to endure."

In the diarrhœal stage, as in every other, rest in bed between blankets is indispensable, with every appliance capable of maintaining bodily heat in the extremities and trunk; turpentine and mustard stupes and epithems to the stomach and abdomen are advisable, with chicken broth, beef-tea, and starchy substances for food; milk and whey, if tolerated by the stomach, are useful; and as beverages, soda water and iced waters *ad libitum* are the most agreeable to the sufferer; barley water and a weak solution of chlorate of potass are also recommended. The medicines administered should be of the simplest nature, and among them dilute sulphuric acid holds the first place.[a] It should be given in repeated doses

[a] The curative value of dilute sulphuric acid has been freely recognised even by the followers of Koch, as it is stated no bacteria or bacillus can exist in an acid solution. These microbes nidify and propagate only in an alkaline base, and become sterilised at once in even a weak acid medium.

of twenty to thirty minims, in some agreeable menstrum, such as camphor mixture, and ten drops of laudanum with each dose increases its efficacy. This was formerly my routine plan of treatment in sporadic or epidemic cholera, but at present discarding all internal remedies, when given *carte blanche*, I merely apply some epispastic fluid with a camel's hair pencil, commencing behind the ear, and extending in the course of the pneumogastric nerve, as far as the angle of the lower jaw. The result is that the purging at once ceases, the patient often falls asleep and awakes cured, long before the vesication takes full effect. In the second stage, with profuse purging and vomiting, spasms and cramps in the stomach, bowels, and limbs, great anxiety, violent palpitation of the heart, and coldness of the extremities, I pursue the same simple plan, and have never found a second application necessary, as all those painful objective and subjective symptoms immediately disappear. In the algide stage, which, according to Claude Bernard, is due to great irritation and hypertrophy of the sympathetic nervous system, the antagonistic powers of the vagus nerves should also be invoked in a similar manner, and, if necessary, the vagus of the left side should also be appealed to by vesication over its course. I prefer usually blistering the right side, as "Kolman has shown, according to Dr. Hall, that the right pneumogastric supplies the whole of the small intestines. This is an *inhibitory* nerve, and has an antagonistic action to that of the sympathetic on the heart; stimulation of the portion of the sympathetic supplying the heart is followed by increased forcible contractions, but stimulation of the vagus going to the heart may cause its stoppage in complete diastole. This having been proved, may not the two nerves act oppositely on the intestines? May not stimulation of the inhibitory vagus be followed by results much the same as if the sympathetic supplying the small intestines were paralysed?"[a]

Stimulation by vesication over the vagus in choleraic purging and vomiting certainly seems in my hands effectually to control and almost paralyse the sympathetic in the stomach and intestines, and to stop at once the inordinate secretions due to its agency. There is another important indication subserved by counter-irritation over the vagus—viz., the restoration of the cardio-inhibitory functions of that nerve which are evidently in abeyance in cases of cholera; the violent contraction and palpitation of the heart are controlled; the dilating power of its walls and cavities, especially of the left side, is restored; and the congestion of the pulmonary and arterial system is put an end to. Both Parkes and Simon testify to the fact of the left side of the heart in cholera being generally found empty, while the right side is distended and full of blood. And Dr. George Budd, in a contribution on "Concentric Hypertrophy of the Left Ventricle," published in the *Med.-Chir. Trans.*, Vol. XXI., states that he met with it in many instances of sudden deaths from cholera;

[a] British Medical Journal, Nov. 7, 1874.

after maceration the cavity of the ventricle, which before would not contain a blanched almond, resumed its natural capacity. Budd also quotes M. Jackson, who, in the Report on Cholera in Paris in 1832, noticed the fact that the hearts of persons who died of the disease often presented the appearance of concentric hypertrophy of the left ventricle. Further light has been thrown on the antagonism of the pneumogastric and sympathetic nerves, at a meeting of the Société de Biologie, in Paris, at which M. d'Arsenval read a note from the unpublished papers of Claude Bernard, on the antagonism of these systems of nerves, and compares their relative action to that of the chorda tympani and the salivary glands.—*Vide Lancet*, January 17, 1885. According to Foster, pp. 244-5, stimulation of the chorda brings about two events—the dilatation of the blood-vessels of the gland, and a flow of saliva. When, however, the cervical sympathetic is stimulated, the vascular effects are exactly contrary of those seen when the chorda is stimulated; the small arteries are contracted; sometimes the flow through the gland is almost arrested. The sympathetic, therefore, in this instance acts as a constrictor nerve, and in this sense is antagonistic to the chorda. Foster says, again, p. 195:—"The injection of the submaxillary gland, which follows stimulation of the chorda tympani, presents a very close analogy to the inhibition of the heart by stimulation of the vagus." Czermak was the first to point out that in the dog the effect of vagus stimulation was hindered by concomitant stimulation of the sympathetic. A plan of treatment adopted by Dr. Hall, and which obtained the approval of Sir Joseph Fayrer, and the Medico-Chirurgical Society of London, at its meeting on 13th October, 1874, merits a special notice, particularly as its *modus operandi* proceeds on the same lines as my vagus treatment of cholera—viz., by influencing and controlling the undue action of the sympathetic in the abdomen. Hall advises the subcutaneous injection of chloral hydrate in solution in the proportion of 10 grains to 100 parts of water, into 4 or 5 parts of the body, according to the size of the syringe. If reaction does not commence in an hour, he injects again. The sedative soothes the contracted nerves, and relaxes the contracted blood-vessels, the blood is more uniformly distributed, the pulse consequently reappears at the wrist, the cramps and abdominal pains subside, sleep is induced, the respiration becomes regular, the discharges lessen, the face fills out, the voice becomes stronger, and the natural secretions are restored. Mr. Higginson, in his report to the Deputy-Commissioner of Oude, at Keri, states that of 19 cases of cholera treated by him on Hall's method, 17 recovered, being about 89 per cent. of cases.

The *rationale* of my plan of treatment may be easily deduced from the physiological facts just detailed. It is simply the practical application in disease of recognised pathological and physiological principles and discoveries, whose constant relationship of antecedence and sequence

suggest the idea of their being governed by a well-defined pathological law. Given a special disorder, dependent upon a serious lesion of the great sympathetic, a system of nerves confessedly under the control of a portion of the cerebro-spinal division—viz., the pneumogastric nerve, when the latter is stimulated to action by an irritant, whether electric, galvanic, or a rapidly-acting vesicant, applied over the site of its sheath in the cervical region, it immediately develops its inhibitory powers, and thus controls and suppresses the exuberant activity of its ordinary antagonist, the great sympathetic. For so far in my experience, the action of the liquor epispasticus of the Pharmacopœia has been sufficient to put a drag on the progress of the disorder; but, as in cholera every moment is precious, the rapid action of the galvanic current should be invoked for the purpose.

In illustration of my plan of treatment in cases of cholera infantum and cholera nostras, or English cholera, I append a few striking cases, selected from a large number. The first two appeared previously in the *Lancet* of August 16th, 1884:—

Case I.—Constable C. sent for me to Queen-street police barrack, on 18th September, 1883, at 8 30 a.m. I found him in the act of vomiting, with small quick pulse, violent cramps, forcible palpitation of the heart; great debility, fainting, and coldness of the extremities. He was purged at frequent intervals, and the dejecta of the usual rice-water character. He informed me that when on duty in the police cells at 4 a.m. same day, he was attacked with profuse vomiting, followed in an hour by violent purging and cramps, an attack occurring about every fifteen minutes. I did not prescribe any internal medicine, but painted him at once in the hollow behind the ears, down as far as the angle of the lower jaw, with the liquor epispasticus of the Pharmacopœia, assuring him at the same time that he would not have any recurrence of the symptoms. I visited him again at 10 30 a.m., and found him convalescent, not having had either sickness or purging, as I had predicted.

Case II.—*Cholera Infantum.*—On September 24th, 1884, I was summoned to a child living in Upton-street, Belfast, aged twenty months, and saw her at 11 30 p.m. I found the child lying prone on the mother's knees, with its arms and legs hanging listlessly on either side; it was cold and feeble, almost pulseless, and was vomiting and purging at the same time. I was told that it had sickened at 6 p.m., and had vomited at least every quarter of an hour till my arrival. Its illness was attributed to a mug of soup, partaken on the previous day. Before my arrival the mother had administered milk and lime-water without any benefit. I did not recommend any medicine, but having placed the child on its back, I applied the blistering fluid with a camel's hair pencil, behind

both ears and on the neck. Soon after the application of the remedy the child fell asleep, and at the expiration of half an hour I left for the night. Calling next day, at 10 a.m., I found the child in its mother's arms quite lively and well; neither vomiting nor purging, as I foretold, had returned.

Case III.—On Sunday, 25th July, 1883, I visited Miss H. She had taken ill with bilious vomiting and purging on the previous Friday, which had continued, till the time of my arrival, at frequent intervals. When I saw her the dejecta was of a pale, watery description; no food had remained on her stomach for several days, and she was exceedingly weak, cold, and pallid. As she was opposed to active treatment, I ordered opium every four hours, and a sedative mixture, with morphia hydrocyanic acid and chloric ether, with mustard epithems to the region of the stomach and abdomen, and to suck pieces of ice when thirsty. These remedies, with wine and light nutriment, were continued all day on Sunday and Monday without any advantage, but with increasing symptoms of debility, and wasted hands and features, and failing pulse. On Tuesday she gave her consent to the vesication; so, suspending all medication internally, I applied the liquor epispastic behind both ears; in a few hours the blister rose, and after one mild attack of vomiting she perfectly recovered.

Case IV.—On Monday, August 4th, 1884, I was sent for at 4 a.m. to see Mrs. L. She had been ill with diarrhœa on the previous Saturday. She was somewhat better on Sunday, but after retiring to rest on that night, the diarrhœa returned in a violent form with vomiting, and she was so much prostrated by the number and the severity of the attacks that she had fainted seven times from 1 a.m. till the time of my arrival. After each attack she required to lie upon the floor for several minutes ere she could bear to be raised to her couch. On the last occasion she had fallen so suddenly that her face was bleeding from coming in contact with the floor. She had severe spasms in her stomach preceding each attack, and she was cold and almost pulseless. Without any delay I applied the blistering fluid behind her right ear, and in the sulcus over the vagus, and left her with her friends. Calling to visit her at noon, I was told that soon after I had left she fell into a sound sleep, and with the exception of one slight discharge from the bowels, all her sickness was at an end.

Case V.—Mrs. L. sent for me on October 14th, 1884, to see her child, aged six months, who had suffered from vomiting and purging for twenty-four hours. The child was greatly reduced, cold, and wan; had not retained any food of a solid or liquid nature for the last day; the pulse

at the wrist was almost imperceptible. I immediately painted the little one in the usual place, informing the mother that all sickness would immediately cease. To re-assure her, I left a prescription for a sedative should any recurrence of the illness take place, but on revisiting the place next day the mother informed me that sleep soon overtook the child, that neither vomiting nor purging had returned, and that the prescription was unneeded.

Case VI.—On 2nd December, 1884, I was sent for to see Mary D., aged twenty-four, unmarried, a servant in a family in the suburbs of Belfast. I found her in the act of vomiting, from which she had been suffering for twenty-four hours. Along with this sickness, she had an attack of rheumatic inflammation in her right knee-joint, which was red, painful, and much swollen. This was her second attack, having been confined to bed for four weeks in 1880, at home in Banbridge. From the previous attack she emerged with valvular disease of the heart. She attributed her present attack to exposure on the previous Sunday to cold, and from having to walk the distance of a mile from the place of worship, through snow and rain, after passing from a heated atmosphere. She had a shivering that night, and on next day her knee became swollen and painful. She was then confined to bed in consequence, and on account of constant and severe sickness of stomach, which returned about every fifteen minutes, leaving her quite prostrate. She was hot and feverish, with intense headache, and pain in the back as well as in the knee; she could not bear the slightest movement or touch upon the knee. Her pulse counted 112; was full and bounding; skin very dry and hot; eyes suffused with crying; temperature, 101·6°. At 8 30 p.m. I applied the blister behind the right ear and down the neck, telling her mistress that her stomach sickness would immediately cease, and that I hoped that the rheumatism would disappear before the morning.

Dec. 3, noon.—Found the girl completely cured of the bilious vomiting, not having had even one attack after I left. She had slept well; a profuse perspiration had replaced the arid skin of the previous day, accompanied with a plentiful secretion of high-coloured urine. All pain had left the knee-joint and spine; the knee was now scarcely susceptible of pain from pressure, swelling almost gone, and it was perfectly flexible. The blister had risen well; I got about four drachms of serum from it by puncture, which was neutral on testing. Temperature still 101·6°; pulse, 92; thirst gone, and strength rapidly returning.

4th.—Slept well; expressed herself quite free from pain and sickness; temperature, 99°; pulse, 60. I saw her again on 6th, when she sat up, and wished to be permitted to resume her work. On 7th she left for the country, and returned to her service a fortnight after.

This case is remarkable as exhibiting at once the controlling power of the remedy over gastric affections, and its dual action in the inhibition

through the cardiac branches of the vagus, of undue cardiac action, and the suppression of neurotic endocarditis, with its accompaniment of joint pains, commonly known by the title of "rheumatic fever."

Many eminent men being strongly of opinion that cholera infantum, cholera nostras, and epidemic cholera, differ only in degree while similar in nature, I now feel quite justified in putting forward the simple remedy so successful in sporadic attacks, as a reasonable means of cure when the disease becomes epidemic; as to the identity of these ailments from a nosological standpoint, many writers and authorities strongly testify their convictions—for instance, Dr. Scriven lately, at a conference held at the Epidemiological Society on this subject, contended that sporadic cholera and epidemic cholera were of exactly the same nature, just as sporadic smallpox resembles the epidemic type.[a]

Dr. Guerin, at the Academy of Medicine, read a paper showing that the distinction between different forms of cholera is purely arbitrary, the malady differing merely in intensity. Dr. Dutrieux Bey, of Alexandria, says, "the distinctions established between Asiatic cholera and cholera nostras were but an arbitrary and artificial device."[b] And Surgeon-Gen. J. M. Cunningham, in a recent report[c] on cholera to the Government of India, asks is an isolated case of measles or smallpox different from the numerous cases which make up an epidemic, are they distinguished as variola nostras, or rubeola nostras; and yet these diseases, just like cholera, have their times of abeyance, and their times of epidemic prevalence.

In the domain of medical research it is seldom, as in that of the more exact sciences, that we can add to our store of knowledge by the aid of the deductive method of reasoning. Any advancement is generally effected by the patient process of clinical observation, or scientific experiment. We begin, in the words of W. H. Walshe, from individual facts, "and rise to those general inferences which are our most comprehensive expression of attainable truth. We cannot from first principles reason down to individual facts, prior to the actual observation of these, and then by the facts themselves, when observed, demonstrate the absolute truth of the principles which enabled us to foresee and to predict them."[d] And yet the history of medicine is not without examples of men gifted with the prescient faculty, by the sole exercise of which they could arrive at conclusions of infinite importance, just as MacCormac was enabled at once to deduce from the nature of the symptoms of cholera the important lesion from which they spring, and to indicate at the same time the kind of remedy most desirable for its cure; that disordered con-

[a] Lancet, September 6th, 1884.
[b] International Congress of Hygiene, Sept 6th, 1884. The Hague Lancet.
[c] Lancet July 28th. 1884.
[d] Address on Medicine, August 9th, 1862. British Medical Journal.

dition of the sympathetic system, which many years later Claude Bernard demonstrated as the causal lesion in cholera, and that mode of treatment which I have advocated as most in accordance with clinical and pathological facts, as well as the most successful in my experience.

Of MacCormac it may freely be admitted, to quote the eloquent words of Walshe, "that in some men whom the *mens divinior* illumines, in whose brains a spark of the divine essence scintillates, thought is grandest; it goes before facts, it creates, it divines them, and leaves experience to drag its slow length along to the goal of truth itself has long since reached. But we speak of the ordinary type of intellectual men, not of those exceptional marvels of whom some two or three are vouchsafed to the world in the course of a century." [a]

[a] Op. cit.

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